

## Skin Adhesive Tape versus Non- Absorbable Sutures in Repair of Laparoscopic Incision

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### ABSTRACT

**Background:** Every year several million women have to undergo gynecological surgery. As a result of that they acquire an abdominal scar. Nowadays women of all ages place extreme importance on the appearance of the scar in addition to the symptoms of pain, tenderness and itching. An aesthetically poor scar can have a negative impact on the overall quality of life causing considerable distress, loss of self-esteem and unhappiness. The appearance of the scar is of significant importance and is often the only reminder of surgery. **Aim of the Study:** to compare between skin adhesive tape (steri-strips) and non-absorbable suture in closure of abdominal laparoscopic port sites.

**Patients and methods:** The current prospective case control study was conducted at Ain Shams University maternity hospital .the participating women were randomly allocated into two arms .Arm (A): women had laparoscopic port sites closed with skin adhesive tape. Arm (B): women had laparoscopic port sites closed with non- absorbable sutures.

**Results:** A total of 142 women were included. The overall incidence of pain was 0.1% and 0.2%, redness was 8.5% and 23.9%,hotness was 2.8% and 12.7%, discharge was 1.4% and 4.2%, impaired healing was 1.4% and 5.6% and satisfaction was 94.4% and 63.4% in arm A and B respectively.

**Conclusion:** using skin adhesive tape (Steri Strep<sup>®</sup>) in closure of abdominal laparoscopic port sites is associated with a decreased risk of wound complications and increased rate of patient satisfaction.

**Keywords:** Skin Adhesive tape, gynecological surgery, Laparoscopic Incision, non-absorbable sutures.

### INTRODUCTION

Every year several million women have to undergo gynecological surgery. As a result of that they acquire an abdominal scar. Nowadays women of all ages place extreme importance on the appearance of the scar in addition to the symptoms of pain, tenderness and itching. An aesthetically poor scar can have a negative impact on the overall quality of life causing considerable distress, loss of self-esteem and unhappiness. The appearance of the scar is of significant importance and is often the only reminder of surgery<sup>(1)</sup>.

The outcome of the surgical skin closure is influenced by the indication for the procedure, the location of the surgical site and the associated intra-operative or post-operative complications. The general medical condition of the patient is also of considerable importance. These factors are usually outside the control of the surgeon. The surgeon, however, can choose the technique of closure and the suture material<sup>(2)</sup>.

The technique of closure should be quick, easy, cost effective and simple, while maximizing wound cosmesis and patient satisfaction. The technique should be based on evidence and not only on the surgeon's preference and tradition. Any of the methods used should be able to restore the physical integrity and function of the injured tissue. Appropriate and careful selection of suture material is important. Choosing the appropriate

materials and adhering to good wound closure technique will ensure optimal wound healing. The ultimate goal of any skin closure technique is to produce skin approximation and adequate healing with minimum wound complications like pain, infection, scarring and keloid formation. Most important to the patient is the pleasing aesthetic affect. Cost of the procedure should also be considered<sup>(3)</sup>.

Tissue adhesives offer the advantages of no risk of needle stick injury and no requirement to remove sutures later. Tissue adhesives have been used primarily in emergency rooms but this review looks at the use of tissue adhesives in the operating room where surgeons are increasingly using these for the closure of surgical skin incisions<sup>(4,5)</sup>.

**Aim of the Study:** to compare between skin adhesive tape (steri-strips) and non-absorbable suture in closure of abdominal laparoscopic port sites regarding: sound healing and patient satisfaction.

### PATIENTS AND METHODS

The current prospective case control study was conducted at the operative wards of Ain Shams University maternity hospital during the period from February 2017 to July 2017. The study included 142 women undergoing laparoscopy and aging 20-40 y. women with

existing local infection or known hypersensitivity to adhesive tape were excluded.

The protocol of the study was approved by the Ethical Research Committee of Obstetrics and Gynecology Department, Ain Shams University. Patient fulfilling the inclusion criteria were approached in the operative ward. The study was explained to patients who were informed with the patient's information leaflet and patients were willing to participate were asked to sign the informed consent. Randomization was kept by the primary investigator and was not revealed until the fulfillment of the study, results and statistics. Randomization was done using a computer-generated random number list generated with MedCalc<sup>®</sup> software version 14 (MedCalc<sup>®</sup> Software bvba, Ostend, Belgium). Study population was randomized into one of the two following arms: Arm (A): (71) Women allocated to this group had laparoscopic port sites closed with skin adhesive tape. Arm (B): (71) Women allocated to this group had laparoscopic port sites closed with non-absorbable sutures.

Allocation concealment was done by numbering 142 opaque envelopes serially and each envelope with the corresponding letter which denoted the allocated group was put according to randomization table. Then all envelopes were closed and put on one box. When the first patient arrived, the first envelope was opened and the patient was allocated according to the letter inside. The preparations and surgical procedure was managed according to Ain Shams maternity hospital operative protocol:

Laparoscopy is performed under general anesthesia..The patient is placed in a low dorso-lithotomy position (gynecological position) with her legs positioned to provide vaginal access .Once the patient is correctly positioned, prepped, and draped, catheter is inserted and (if needed) the uterine manipulator is placed.  
Vertical percutaneous incision at the umbilicus to place the initial trocar.

## RESULTS

**Table (1)** Pain (VAS-10) among the studied groups

Measures	Study (N=71)	Control (N=71)	<sup>^P</sup>
Median (IQR)	0.0 (0.0–0.0)	0.0 (0.0–0.0)	
Range	0.0–2.0	0.0–2.0	0.53

<sup>^</sup>Mann Whitney test

Table (1) and figure (1) show that: **Pain** was non-significant change among study group than among control group.

.A veress needle and insufflator inserted through the incision for creating the initial pneumoperitoneum

.Irrigation and aspiration test to confirm the proper intra-peritoneal placement of the veress needle

.Carbon dioxide gas is pumped through the veres to inflate abdomen.

.Insertion of the primary trocar and introducing the endoscope.

.Up to a total of four incisions will be made to allow other instruments to be inserted.

.After the procedure is done, the instruments will be removed

.Incisions will be closed and the subjected cases were divided as follow:

- **In group 1** Steri strips (3M™ Steri-Strip™ 6 mm x 100 mm) (3M HealthCare, St. Paul, MN, USA) were applied perpendicular to the wound by lifting the skin edges up with gloved finger, placing the first 1/2 of steri strip tape with 90 degree angle over the edges, pressing firmly, ensure edges were met together then placing the other half and press firmly.

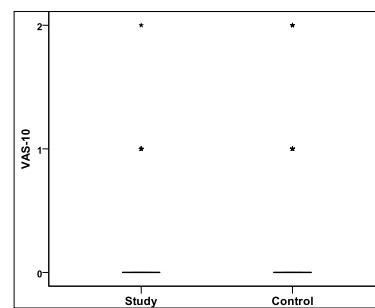
- **In group 2** transcutaneous suture are placed to approximate the wound edges that is discontinuous with its anatomical planes.

.All sites were covered with a self-adhesive bandage.

Any complication will be recorded and the patient will be asked if she had any problem during the 7 days following the laparoscopic surgery.

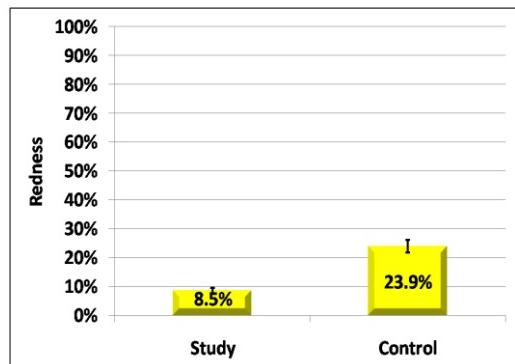
During the second visit 7-10 days after the laparoscopic surgery; patient satisfaction, wound healing and documented signs of infection as redness, hot incision site and continual pain will be evaluated.

**Ethical Consideration:** Patient fulfilling the inclusion criteria were approached in the operative ward. The study was explained to patients who were informed with the patient's information leaflet and patients were willing to participate were asked to sign the informed consent.



**Table (2) Redness among the studied groups**

Measures	Study (N=71)	Control (N=71)	#P	
Present	6 (8.5%)	17 (23.9%)	<b>0.012*</b>	
Absent	65 (91.5%)	54 (76.1%)		
<b>Benefit of study over control in avoiding redness</b>				
Items	Value	<b>95% CI</b>		
Rate in study group	91.5%	84.8%–96.3%		
Rate in control group	76.1%	71.3%–82.8%		
Rate elevation	15.5%	2.0%–25.0%		
Efficacy	20.4%	2.4%–35.1%		
Relative Rate	1.204	1.024–1.351		
Number needed to treat	6.5	4.0–50.4		

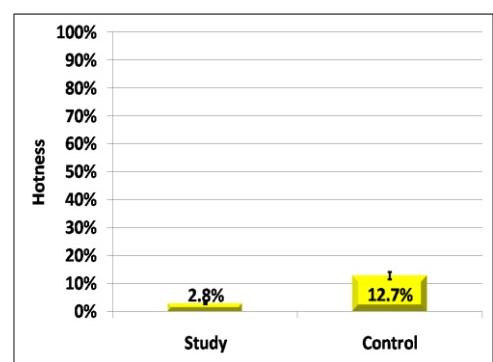


#Chi square test, \*Significant, CI: Confidence interval

Table (2) and figure (2) show that: **Redness** was significantly less frequent among study group than among control group.

**Table (3) Hotness among the studied groups**

Measures	Study (N=71)	Control (N=71)	#P	
Present	2 (2.8%)	9 (12.7%)	<b>0.028*</b>	
Absent	69 (97.2%)	62 (87.3%)		
<b>Benefit of study over control in avoiding hotness</b>				
Items	Value	<b>95% CI</b>		
Rate in study group	97.2%	92.1%–99.5%		
Rate in control group	87.3%	85.0%–92.4%		
Rate elevation	9.9%	-0.3%–14.5%		
Efficacy	11.3%	-0.4%–17.0%		
Relative Rate	1.113	0.996–1.170		
Number needed to treat	10.143	6.9→100.0		

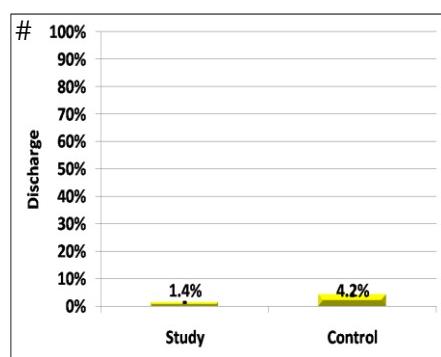
**Figure (3) Hotness among the studied groups**

# Fisher's Exact test, \*Significant, CI: Confidence interval

Table (3) and figure (3) show that: **Hotness** was significantly less frequent among study group than among control group.

**Table (4) Discharge among the studied groups**

Measures	Study (N=71)	Control (N=71)	#P	
Present	1 (1.4%)	3 (4.2%)	0.620	
Absent	70 (98.6%)	68 (95.8%)		
<b>Benefit of study over control in avoiding discharge</b>				
Items	Value	<b>95% CI</b>		
Rate in study group	98.6%	95.6%–99.9%		
Rate in control group	95.8%	94.4%–98.8%		
Rate elevation	2.8%	-3.1%–5.5%		
Efficacy	2.9%	-3.2%–5.8%		
Relative Rate	1.029	0.968–1.058		
Number needed to treat	35.5	18.2→100.0		

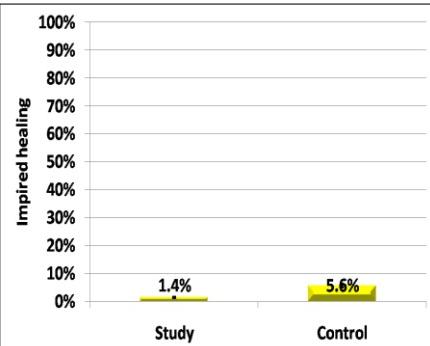
**Figure (4) Discharge among the studied groups**

Fisher's Exact test, \*Significant, CI: Confidence interval

Table (4) and figure (4) show that: **Discharge** was non-significantly less frequent among study group than among control group.

**Table (5) Impaired healing among the studied groups**

Measures	Study (N=71)	Control (N=71)	#P
<b>Present</b>	1 (1.4%)	4 (5.6%)	
<b>Absent</b>	70 (98.6%)	67 (94.4%)	0.366
<b>Benefit of study over control in avoiding impaired healing</b>			
Items	Value	95% CI	
<b>Rate in study group</b>	98.6%	95.1%–99.9%	
<b>Rate in control group</b>	94.4%	93.0%–97.9%	
<b>Rate elevation</b>	4.2%	-2.8%–6.9%	
<b>Efficacy</b>	4.5%	-2.8%–7.4%	
<b>Relative Rate</b>	1.045	0.972–1.074	
<b>Number needed to treat</b>	23.667	14.506–>100.0	

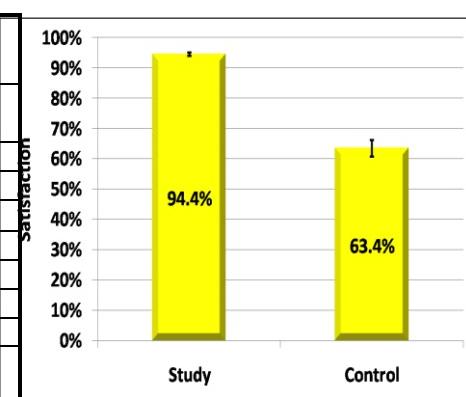
**Figure (5) Impaired healing among the studied groups**

#Fisher's Exact test, \*Significant, CI: Confidence interval

Table (5) and figure (5) show that: **Impaired healing** was non-significantly less frequent among study group than among control group.

**Table (6) Satisfaction among the studied groups**

Measures	Study (N=71)	Control (N=71)	#P
<b>Satisfied</b>	67 (94.4%)	45 (63.4%)	
<b>Not satisfied</b>	4 (5.6%)	26 (36.6%)	<0.001*
<b>Benefit of study over control in getting satisfaction</b>			
Items	Value	95% CI	
<b>Rate in study group</b>	94.4%	87.4%–98.1%	
<b>Rate in control group</b>	63.4%	59.6%–70.3%	
<b>Rate elevation</b>	31.0%	17.1%–38.5%	
<b>Efficacy</b>	48.9%	24.3%–64.5%	
<b>Relative Rate</b>	1.489	1.243–1.645	
<b>Number needed to treat</b>	3.2	2.6–5.9	

**Table (6) Satisfaction among the studied groups**

#Chi square test, \*Significant, CI: Confidence interval

Table (6) and figure (6) show that: **Satisfaction** was significantly more frequent among study group than among control group.

## DISCUSSION

Laparoscopy is an operation performed in the abdomen or pelvis through small incisions with the aid of a camera. It can either be used to inspect and diagnose a condition or to perform surgery. Surgery involving laparoscope is also called minimally invasive surgery because operations are performed using multiple small incisions (0.5 to 1.5 cm) in contrast to traditional methods which use large incisions<sup>(6)</sup>.

Operative laparoscopy has become the standard approach for most common surgeries, including tubal ligation, cholecystectomy, appendectomy, and ovarian cystectomy<sup>(6)</sup>.

In the past, suturing (using needle and thread) was the option for wound closure but more recently other alternative become available such as adhesive tapes, staples and tissue adhesives glue. Sutures may induce reactivity and sometimes they require removal, which may explain the discomfort and tightness feeling<sup>(4)(7)</sup>.

Tissue adhesives offer the advantages of no risk of needle stick injury and no requirement to remove sutures later. Tissue adhesives have been used primarily in emergency rooms but this review looks at the use of tissue adhesives in the operating room where surgeons are increasingly using these for the closure of surgical skin incisions<sup>(4)(5)</sup>.

Properties of the ideal wound closure include accurate skin edge apposition, adequate but not excessive tension on the wound edges, safety, ease to apply and remove the material used and a good cosmetic result<sup>(8)</sup>.

3M™ Steri-Strip™ Skin Closures are made of porous, nonwoven material. They are reinforced with filaments for strength and are coated with a hypoallergenic adhesive. They are designed to allow for tissue expansion and movement and are coated with a hypoallergenic adhesive<sup>(9)</sup>.

Tapes can be used for the closure of small wounds or as an adjunct to other methods of wound closure. Advantage of tapes include that it is quick and easy and also does not leave hatch marks and the patient does not have to follow up. The disadvantage is that the wound edges cannot be fully everted. Moisture, soap and dampness that collects under it can delay wound healing. They are available in different shapes and colours<sup>(10)</sup>.

The present study compared the transcutaneous suture to the adhesive tape (Steri Strep®) in closure of abdominal laparoscopic port sites, in wound healing, pain and patient satisfaction. The results showed there was no clinically and statistically difference in the two methods of wound closure with regards to patient characteristics as age, weight, height, body mass index, length of the scar and hospital stay.

Reflecting the age-old dictum, “It’s always important to never say always and never,” there is no one best suture or suture material to be ideal in all aspects. The current study focused on finding new method for skin repair trying to be quick, painless, and easy to perform and preferably will not increase pain.

## CONCLUSION

To conclude, it was found that the use of adhesive tape (Steri Strep®) in closure of abdominal laparoscopic port sites is associated with a decreased risk of wound complications. Occurrence of wound complications is the most important factor that influenced patient satisfaction. However more studies are needed on larger number of subjects to confirm these results.

## RECOMMENDATION

This study supports the use of adhesive tape (Steri Strep®) in closure of abdominal laparoscopic port sites as it is considered of value in reducing postoperative pain with better wound healing. The advantages of unsuturing the skin and keeping it opposed without fearing of increase the infection rate may be of great value in many obstetric and gynecological procedures.

## REFERENCES

- Brown BC, Moss TP, McGrouther DA *et al.* (2008):** Skin scar preconceptions must be challenged: importance of self-perception in skin scarring. *J Plast Reconstr Aesthet Surg.*, 63(6): 1022-9.
- Tully L, Gates S, Brocklehurst P *et al.* (2002):** Surgical techniques used during caesarean section operations: results of a national survey of practice in the UK. *Eur J Obstet Gynecol Reprod Biol.*, 102(2): 120-6.
- Meeks GR, Nelson KC, Byars RW (1995):** Wound strength in abdominal incisions: a comparison of two continuous mass closure techniques. *Am J Obstet Gynecol.*, 173(6):1676-82.
- Coulthard P, Esposito M, Worthington H *et al.* (2010):** Tissue adhesives for closure of surgical incisions. *Cochrane Database of Systematic Reviews*,5: CD004287.
- Dumville J, Coulthard P, Worthington H *et al.* (2014):** Tissue adhesives for closure of surgical incisions. *Cochrane Wounds Group*; 28 (11): CD004287.
- Goldberg JM. (2010):** Indications and contraindications for laparoscopy. In: Falcone T, Goldberg JM. Basic, Advanced and Robotic Laparoscopic Surgery. Saunders
- Frochlich J and Kettle C (2015):** Continuous sutures in second-degree tears and episiotomies. *BMJ Best Practice*,23:34-38.
- Kolt JD (2003):** Use of adhesive surgical tape with the absorbable continuous subcuticular suture. *ANZ J Surg.*, 73:626.
- Romero P, Frongia G, Wingerter S *et al.* (2011):** Prospective, randomized trial comparing a tissue adhesive with adhesive strips for the closure of laparoscopic trocar wounds in children. . *Eur J Pediatr Surg.* ,21(3):159-162
- Telindes Jo, Howard W (2003):** III operative gynaecology .ninth edition , Saunders, Pp: 255-289.